

# NASA TECH BRIEF

## *Marshall Space Flight Center*



NASA Tech Briefs announce new technology derived from the U.S. space program. They are issued to encourage commercial application. Tech Briefs are available on a subscription basis from the National Technical Information Service, Springfield, Virginia 22151. Requests for individual copies or questions relating to the Tech Brief program may be directed to the Technology Utilization Office, NASA, Code KT, Washington, D.C. 20546.

### Stereoscopic Computer Graphics Display System

Human assimilation of the vast quantities of data made available by modern computer systems threatens to be a limiting factor in systems effectiveness. One approach to extend this limit is centered around the development of visual display devices to be used as integral parts of such systems. A clear and simple display of multivariable data outputs would enhance human assimilation of data significantly and thus would improve man-machine communication effectiveness.

In view of these developments, a study was made which evaluates two general-purpose, stereoscopic display systems. The published handbook on the study, entitled "A Stereoscopic Computer Graphics Display System," describes the relative merits of each system. Both systems are adaptable to most small data processing facilities and, with minimal hardware development, greatly enhance user ability to interact with the computer and to interpret data output.

Before actual system description, the handbook presents the historical development of stereoscopic instruments, with a brief introduction to the phenomenon of binocular perception. Several human psychological and physiological factors are discussed in relation to computer graphics.

Some of the more promising techniques for creating the illusion of depth are reviewed, including stereoscopes, anaglyphs, polarizers, and lenticular arrays. The list is by no means exhaustive, but rather those felt to be most applicable to the display of computer data are selected.

Next, the rotation and projection equations that are used in the realization of such a display system are presented. The projection equations generate the planar stereoscopic pairs required for viewing with relief.

Using the approach developed, a system realization is centered around a small, general-purpose digital computer. To provide certain real-time data processing advantages, the system is also implemented with an analog computer as the central processor. The performance of each system then is evaluated, and stereograms generated by the units are included.

Finally, the handbook lists FORTRAN IV and DAP-16 programs utilized in digital computer implementation. In addition, a section is included which describes digital-to-analog converters designed for use with the system.

#### Note:

Requests for further information may be directed to:  
Technology Utilization Officer  
Marshall Space Flight Center  
Code A&PS-TU  
Marshall Space Flight Center, Alabama 35812  
Reference: B73-10526

Source: H. H. Plott, Jr., and J. D. Irwin of  
Auburn University  
under contract to  
Marshall Space Flight Center  
(MFS-22322)